REMARKS

Claims 1-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Forbes et al. (U.S. Patent No. 5,926,740) and Laboda et al. (U.S. Patent No. 5,818,071) and further in view of the Townsend article. In view of the amendments to the claims in the following remarks, the rejections are respectfully traversed, and reconsideration of the rejections is requested.

The applicants' previous claim amendments, namely, specifying that the silicon oxycarbide layer is treated with plasma after the silicon oxycarbide layer is formed, are not intended to imply temporal ordering to process steps. Rather, the amendments were intended to clarify that the plasma treatment is performed on a completed silicon oxycarbide layer, in contrast to the teaching of Forbes et al. in which plasma is used in the formation of the silicon oxycarbide layer. That is, Forbes et al., do not treat a silicon oxycarbide layer using plasma. Instead, they form a silicon oxycarbide layer using plasma. As noted in the applicants' specification, in one embodiment of the invention, the silicon oxycarbide layer can be formed, as it is in Forbes et al., using plasma enhanced chemical vapor deposition (PECVD). Hence, the applicants recognize that silicon oxycarbide layers may be formed using PECVD. However, in accordance with the applicants' invention, the completed silicon oxycarbide layer is also treated with plasma. (See specification at, for example, page 14, lines 9-10). This is in contrast to Forbes et al., where plasma is used to form a silicon oxycarbide layer, but, the completed layer is not then treated with plasma.

The applicants' claimed plasma treatment is performed to enhance fabrication and performance of the resulting semiconductor device. In accordance with the applicants' invention, the silicon oxycarbide layer has a low dielectric constant and, as a result, parasitic capacitance is reduced. Also, by treating the silicon oxycarbide layer with plasma, the invention further improves the layer by eliminating a "footing" phenomenon of photoresist patterns formed on the silicon oxycarbide layer which results when nitrogen atoms in an oxycarbide layer interfere with the reaction in photoresist. Also, a silicon oxycarbide layer in accordance with the prior art can

be lifted by chemical mechanical polishing (CMP) processes or it can be scratched. Also, a silicon oxycarbide layer of the prior art has a low adhesive force with layers stacked on the silicon oxycarbide layer. The other upper layers can therefore be lifted from the silicon oxycarbide layer. In accordance with the invention, treatment of the completed silicon oxycarbide layer with plasma solves these and other problems.

In the Forbes et al. reference, the silicon oxycarbide layer is formed using plasma enhanced chemical vapor deposition (PECVD). However, there is no subsequent plasma treatment step and, therefore, the Forbes et al. structure would be prone to the drawbacks of the prior art discussed above. Accordingly, since Forbes et al. do not teach or suggest the plasma treatment of a formed silicon oxycarbide layer, Forbes et al. fail to teach or suggest the invention claimed by the applicants.

Laboda et al. is cited as teaching silicon oxycarbide as a low-dielectric constant material. However, Laboda et al. fail to teach or suggest forming the silicon oxycarbide layer on a substrate and treating the formed silicon oxycarbide layer with plasma, as claimed by the applicants. Accordingly, Laboda et al. also fail to teach or suggest the invention claimed by the applicants in the amended claims.

The Examiner raises the issue of piecemeal analysis of references cited in the 35 U.S.C. §103(a) rejection based on Forbes et al. and Laboda et al. However, the applicants' arguments address the combination of references. Specifically, since neither of the references teaches or suggests plasma treatment of a formed oxycarbide layer, there is no combination of the references which would result in providing such teaching or suggestion. Both references teach an oxycarbide layer. Forbes et al. teach forming the oxycarbide layer using plasma. Laboda et al. teach silicon oxycarbide as a low-dielectric-constant material. However, no combination of the references results in treatment of a formed silicon oxycarbide layer using plasma. The applicants believe that their analysis is based on the combination of the references despite the necessary discussion of what is disclosed by each of the references individually. The applicants' analysis is based upon the combination of the teachings of the references. With regard to the Townsend

article, there is also no teaching or suggestion of treatment of a formed silicon oxycarbide layer using plasma. Accordingly, the Townsend article also fails to teach or suggest the claimed invention, and therefore, there is no combination of Townsend with Forbes et al. and Laboda et al. which would result in such teaching or suggestion.

None of the cited references, taken alone or in any combination, teaches or suggests the invention claimed by the applicants in the amended claims. Accordingly, it is believed that the claims are allowable over the cited references, and reconsideration of the rejections of the claims under 35 U.S.C. §103(a) based on Forbes et al., Laboda et al. and Townsend is respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current Amendment. The attached pages are captioned "Version with Markings to Show Changes Made."

In view of the amendments to the claims and the foregoing remarks, it is believed that, upon entry of this Amendment, all claims pending in the application will be in condition for allowance. Therefore, it is requested that this Amendment be entered and that the case be allowed and passed to issue. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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Mills & Onello, LLP
Eleven Beacon Street, Suite 605
Boston, MA 02108
Telephone: (617) 994-4900
Facsimile: (617) 742-7774

Steven M. Mills
Registration Number 36,610
Attorney for Applicants

Version with Markings to Show Changes Made

1. (Twice Amended) A method of fabricating a semiconductor device having a low dielectric interlayer insulation layer, the method comprising:

forming a silicon oxycarbide layer as the low dielectric interlayer insulation layer on a substrate;

[after the silicon oxycarbide layer is formed,] treating the formed silicon oxycarbide layer with plasma; and

stacking photoresist on the plasma-treated oxycarbide layer and patterning the resultant structure.

11. (Twice Amended) A method of fabricating a semiconductor device having a low dielectric interlayer insulation layer, comprising:

stacking a silicon oxycarbide layer (SiOC) as the low dielectric interlayer insulation layer on a substrate;

[after the silicon oxycarbide layer is formed,] treating the formed silicon oxycarbide layer with plasma; and

forming an interconnection at the silicon oxycarbide layer using a damascene process.